XI.4 Ultra-High Productivity Metal Membranes for Hydrogen Production Applications (STTR Phase I Project)

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Durable, ultra-high productivity, low-cost hydrogen membranes for water-gas shift membrane reactors have been identified by the DOE as critical for low cost hydrogen production from coal or other fuels. The DOE has set aggressive membrane cost and performance targets, which, if met, promise to revolutionize hydrogen production. This project will develop a novel process for producing high quality, low-cost foil membranes by an etch process starting from commercially available materials. This method for fabricating thin, defect free foils promises to be far less costly than other, more conventional approaches of deposition or mechanical rolling. Phase I will demonstrate the feasibility of membrane thinning to produce defect free foils less than 5 microns thick. Foil performance will be evaluated under severe operating conditions to assess ultra-thin membrane performance and durability. Membrane performance and economics will be compared to DOE targets.